

wherein each of R₁₋₅ is independently selected from the group consisting of H, Me, Et, tBu, Ph, iPr, CF₃, SiH₃, SiMe₃, Si(CF₃)₃, Si(Et)₃, Si(iPr)₃, Si(tBu)₃, Si(Ph)₃, and Si(SiMe₃)_x(Me)_{3-x}, wherein x is an integer from 1 to 4 inclusive; y is an integer from 1 to 3 inclusive; and z is an integer from 1 to 3 inclusive; and

(x) (Cpⁿ)Ta(SiR₁R₂R₃)_x(NR₄R₅)_{4-x} / (Cpⁿ)₂Ti(SiR₁R₂R₃)(NR₄R₅)

wherein each of R₁₋₅ is independently selected from the group consisting of H, Me, Et, tBu, Ph, iPr, CF₃, SiH₃, SiMe₃, Si(CF₃)₃, Si(Et)₃, Si(iPr)₃, Si(tBu)₃, Si(Ph)₃, Si(SiMe₃)_y(Me)_{3-y} and Cpⁿ is C₅H₂Me_(5-z), wherein x is an integer from 1 to 3 inclusive; y is an integer from 1 to 3 inclusive; and z is an integer from 0 to 5 inclusive.

2. (Amended) The method according to claim 1, of forming Ta material on said substrate from said precursor, wherein said precursor is a tantalum species selected from the group consisting of tantalum species (i), (ii), (iii), (iv), (v) and (vi), and wherein said Ta material is TaN.

REMARKS

I. Affirmation of Provisional Election

Applicants hereby affirm the prior provisional election to prosecute the invention of species A_(iv), tantalum amide compounds of Ta(NRR')₅, made by the undersigned attorney on July 21, 2000 and July 25, 2000.

Further, applicants confirm that pentakis (N-methyl, N-ethylamido) Tantalum (previously labeled A_(o)) is a subspecies of A_(iv).

Upon allowance of a generic claim, applicant will be entitled to consideration of claims to species A_(i-iii), A_(v-x) and B_(i-iii) which the Examiner has withdrawn from further consideration under 37 CFR §1.142(b), as being drawn to a non-elected invention.

The claims readable on the elected species A_(iv) are claims 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 and 15; and the claims readable on the “pentakis” subspecies (“pentakis”) are claims 16, 17, 18, 19 and 20.

II. Acknowledgement of Allowance of Claims 17-20

The Examiner’s allowance of claims 17-20 is acknowledged.

III. Objection to or Rejection of Claims 5-16 under 35 U.S.C. 112, Second Paragraph

Claims 5-16 have been objected to/rejected (August 3, 2001 Office Action, page 4) under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention.

Applicants have responsively amended claim 5 to remove the subscripting of the hyphen and to add the appropriate operator between R and R’.

Additionally, applicants have amended the variables in claim 5 in accordance with Examiner's requirement for same, and minor revisions have been made in the claim to improve its readability.

IV. Rejection of Claims 5-8 and 10-11 Under 35 U.S.C. 102(b)

The Examiner has rejected claims 5-8 and 10-11 under 35 U.S.C. 102(b) as being anticipated by Wilkinson (U.S. Patent 3,288,829).

Applicants have responsively amended claim 5 to recite in subparagraph (vi) that R in the cyclopentadienyl compound is trimethylsilyl. The resulting trimethylsilylcyclopentadienyl tantalum compound is not in any way taught or suggested in Wilkinson.

The rejection of claims 6-8 and 10-11 based on Wilkinson is thereby obviated, since such claims are of dependent form under claim 5.

Claims 5-8 and 10-11 therefore are patentably distinguished over the art and are now in form and condition for allowance.

V. Rejection of Claim 9 Under 35 U.S.C. 103(a)

In the August 3, 2001 Office Action, Claim 9 was rejected under 35 U.S.C. 103(a) over Wilkinson. The amendment of claim 5 hereinabove obviates the rejection, since claim 9 is of dependent form under claim 5.

Claim 9 therefore is patentable over the art.

VI. The Rejections of Claims 5-6 and 12-15 Under 35 U.S.C. 102(e)

In the August 3, 2001 Office Action, the Examiner rejected claims 5-6 and 12 under 35 U.S.C. 102(e) as being anticipated by Shin et al. (Shin et al. (1997) MOCVD of Titanium Nitride from a New Precursor, $Ti[N(CH_3)C_2H_5]_4$. Chem. Mater. 9:76-80). Applicants have responsively amended subparagraphs (vii) and (ix) of claim 5 to specify that x has an integer value between 1 and 5, and y (previously defined as x) has an integer value between 1 and 4. Claim 5 therefore is patentably distinguished over Shin et al., as are claims 6 and 12, each of which depends from claim 5.

The Examiner also has rejected claims 5-6 and 12-15 under 35 U.S.C. § 102(e) as being anticipated by Sun et al. (U.S. Patent 5,668,054). Applicants have responsively amended subparagraph (viii) of claim 5 to include the proviso that $R_1 \neq ^1Bu$ and $R_2 \neq R_3 = Et$. Claim 5 therefore is patentably distinguished over Sun et al., as are claims 12-15, each of which depends directly or indirectly from claim 5.

VIII. Rejection of Claims 7-9 Under 35 U.S.C. 103(a)

In the August 3, 2001 Office Action, the Examiner has rejected claims 7-9 under 35 U.S.C. 103(a) as being unpatentable over Sun et al., alone or in view of Wilkinson. Claim 5 has been amended hereinabove to patentably distinguish over the cited art, and claims 7-9 dependent thereunder are likewise patentable.

IX. Rejection of Claim 16 Under 35 U.S.C. 112, 2nd Paragraph

In the August 3, 2001 Office Action, claim 16 was indicated to be allowable if rewritten to overcome §112, second paragraph issues and incorporate the subject matter of the base claim 5 from which claim 16 depends.

Base claim 5 has been amended herein to overcome the §112, second paragraph rejection, and claim 16 thereunder now is correspondingly allowable.

X. Conclusion

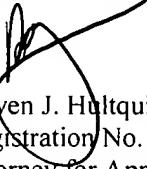
All rejections of the claims have been overcome by the amendments made herein.

The rejections in the August 3, 2001 Office Action therefore are traversed in application to the amended claims 5-20. It therefore is respectfully requested that the Examiner withdraw all 35 U.S.C. 112 rejections and 35 U.S.C. 102 and 103 rejections, and issue a Notice of Allowability for amended claims 5-20.

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In the event that any issues remain, the Examiner is requested to contact the undersigned attorney at (919) 419-9350 to discuss same, in order that the application may be passed to allowance at an early date.

Respectfully submitted,


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